

## CLAIMS

What is claimed is:

- 1        1. A method for sharing a decoder among a plurality of data streams
- 2        comprising:
  - 1            decoding data samples from a first data stream in said plurality of data
  - 2            streams;
  - 3            storing N data samples processed from said first data stream in a replay
  - 4            buffer before decoding data from other data streams in said plurality; and
  - 5            replaying said N data samples stored in said replay buffer to restore said
  - 6            decoder to a state said decoder was in when it last decoded said data samples
  - 7            from said first data stream prior to processing any new data samples from said
  - 8            first data stream.
- 1        2. The method as in claim 1 further comprising:
  - 2            temporarily storing a plurality of accumulator values associated with said
  - 3            first data stream in an accumulator buffer; and
  - 4            restoring said accumulator values prior to replaying said N data samples
  - 5            stored in said replay buffer.
- 1        3. The method as in claim 2 wherein N accumulator values are stored in
- 2        said buffer and associated with said first data stream.
- 1        4. The method as in claim 1 wherein said decoder is a forward-error-
- 2        correction (“FEC”) decoder.

1       5. The method as in claim 1 wherein said decoder is a maximum  
2 likelihood decoder.

1       6. The method as in claim 1 wherein said decoder is a convolutional  
2 decoder.

1       7. The method as in claim 1 wherein said decoder is a Viterbi decoder.

1       8. The method as in claim 7 wherein N is a particular Viterbi trellis depth.

1       9. The method as in claim 1 wherein said data streams are from  
2 different satellite transponders.

1       10. The method as in claim 1 wherein said data streams are from  
2 different cable carriers.

1       11. A decoder replay method comprising:  
2           decoding a first set of data from a first data stream to generate a first  
3           plurality of decoded data, said decoder being in a first state after decoding said  
4           first set of data;  
5           temporarily storing said first set of data in a buffer;  
6           decoding other sets of data from one or more other streams;  
7           restoring said decoder to said first state by re-decoding said first set of  
8           data from said buffer; and  
9           decoding a second set of data from said first data stream once said  
10          decoder is restored to said first state, said decoder being in a second state after  
11          decoding said second set of data.

1       12. The method as in claim 11 further comprising:  
2           temporarily storing said second set of data in a buffer said second set of  
3       data being usable to restore said decoder to said second state after said  
4       decoder has decoded additional data from said one or more other streams.

1       13. The method as in claim 11 further comprising:  
2           temporarily storing a plurality of accumulator values associated with said  
3       first data stream in an accumulator buffer; and  
4           restoring said accumulator values prior to replaying said first set of data  
5       stored in said buffer.

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1       14. The method as in claim 11 wherein said decoder is a forward error  
2       correction (“FEC”) decoder.

1       15. The method as in claim 11 wherein said decoder is a Viterbi decoder.

1       16. The method as in claim 11 wherein said first and second data streams  
2       are transmitted from first and second transponders, respectively.

1       17. A system comprising:  
2           a decoder for decoding data from a plurality of data streams;  
3           data replay means for restoring said decoder to a state it was in when it  
4       previously decoded data from each respective data stream, before decoding new  
5       data from each respective data stream.

1        18. The system as in claim 17 wherein said data replay logic comprises a  
2        replay buffer for temporarily storing pluralities of data from each respective data  
3        stream, said pluralities of data being usable by said replay logic to restore said  
4        decoder to a state it was in when it previously decoded data from each  
5        respective data stream.

1        19. The system as in 18 further comprising:  
2            accumulator storage means for temporarily storing accumulator values  
3            associated with each respective data stream.

1        20. The system as in claim 19 wherein the number of accumulator values  
2        associated with each data stream are equivalent in number to a number of data  
3        samples from each data stream stored in said replay buffer.

1        21. The system as in claim 17 wherein said decoder is a Viterbi decoder.

1        22. The system as in claim 17 wherein said decoder is a Turbo Code  
2        decoder.

1        23. The system as in claim 17 wherein each of said data streams  
2        contains data from a different satellite transponder.

1        24. The system as in claim 17 further comprising:  
2            one or more additional decoders for decoding a plurality of additional data  
3        streams; and

4           additional data replay logic for restoring said decoders to previous states  
5   when said decoders previously decoded data from each respective data stream,  
6   before said decoders decode new data from each respective data stream.

1           25. A machine-readable medium having code stored thereon which  
2   defines an integrated circuit (IC), said IC comprising:  
3           a decoder for decoding data samples from a first data stream in said  
4   plurality of data streams;  
5           a replay buffer for storing N data samples processed from said first data  
6   stream in a replay buffer before decoding data from other data streams in said  
7   plurality; and  
8           replay logic to replay said N data samples stored in said replay buffer and  
9   to thereby restore said decoder to a state said decoder was in when it last  
10   decoded said data samples from said first data stream prior to processing any  
11   new data samples from said first data stream.

1           26. The machine-readable medium as in claim 25 further comprising:  
2           accumulator storage logic to temporarily store a plurality of accumulator  
3   values associated with said first data stream in an accumulator buffer; and  
4           accumulator restoration logic to restore said accumulator values prior to  
5   replaying said N data samples stored in said replay buffer.

1           27. The machine-readable medium as in claim 26 wherein N accumulator  
2   values are stored in said buffer and associated with said first data stream.

1           28. The machine-readable medium as in claim 25 wherein said decoder is  
2   a forward-error-correction (“FEC”) decoder.

1        29. The machine-readable medium as in claim 25 wherein said decoder is  
2        a maximum likelihood decoder.

1        30. The machine-readable medium as in claim 25 wherein said decoder is  
2        a convolutional decoder.

1        31. The machine-readable medium as in claim 25 wherein said decoder is  
2        a Viterbi decoder.

1        32. The machine-readable medium as in claim 31 wherein N is a  
2        particular Viterbi trellis depth.

1        33. The machine-readable medium as in claim 25 wherein said data  
2        streams are from different satellite transponders.

1        34. The machine-readable medium as in claim 25 wherein said data  
2        streams are from different cable carriers.